

NEW NEARCTIC *INVREIA* (HYMENOPTERA: CHALCIDIDAE)
FROM LEPIDOPTEROUS PESTS OF PEANUT

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Abstract.—*Invreia deceptor*, *I. usta*, and *I. threa*, new species, are described and keyed based on material reared from lepidopterous pupae collected in peanuts. All three new species are known from Texas and attack pupae of *Elasmopalpus lignosellus* (Zeller). *Invreia deceptor* and *I. threa* are also known from Oklahoma, where *deceptor* attacks *E. lignosellus* and *Stegasta bosqueella* (Chambers), but *threa* so far is known to parasitize only the latter host. *Invreia mirabilis* of Wall and Berberet, the only previously reported *Invreia* in the New World, is a misidentification of *deceptor*; *I. mirabilis* Bouček is a valid Old World species.

Invreia mirabilis Bouček, an Old World species, has thus far been the only member of the genus known from the New World. It was recently reported from Oklahoma by Wall and Berberet (1975) as a parasite of lepidopterous pests on peanuts. In studying the Wall and Berberet specimens as well as additional material from Texas, we find that *mirabilis* is a misidentification and that three undescribed species are represented. Because several workers are holding manuscripts pending the identification of these specimens, we take this opportunity to describe three new species of *Invreia*. *Invreia mirabilis* is a valid Old World species but is not known to occur in the Western Hemisphere.

The most recent revision of *Invreia* was by Nikol'skaya (1960) who treated 17 species worldwide. Since that time one species has been described by Steffan (1962; *festiva*) and another by Habu (1970; *ghanii*). Habu also cited taxonomic literature for the genus but overlooked a paper by Erdős (1957) describing the female of *I. mirabilis*. Additionally Steffan (1976) transferred the previously described species *elegantula* Masi from *Euchalcidia* to *Invreia*, making a total of 20 described species worldwide to date. We add

another three species in this paper, the only ones thus far known from the New World. Habu (1970) summarized distribution for *Invreia* as "Africa and Europe to Central Asia." The only host records for *Invreia* were pupae of *Myelois cincitpalpella* Christ (Pyralidae) for *I. rufitarsis* (Illiger) (Nikol'skaya, 1960) and pupae of *Chilo partellus* Swinhoe (Pyralidae) for *I. ghanii* (Habu, 1970). To these hosts were added the Nearctic records for pupae of *Elasmopalpus lignosellus* (Zeller) (Pyralidae) and *Stegasta bosqueella* (Chambers) (Gelechiidae) for *I. "mirabilis"* of Wall and Berberet (1975). These Nearctic records now refer to the *Invreia* species described below.

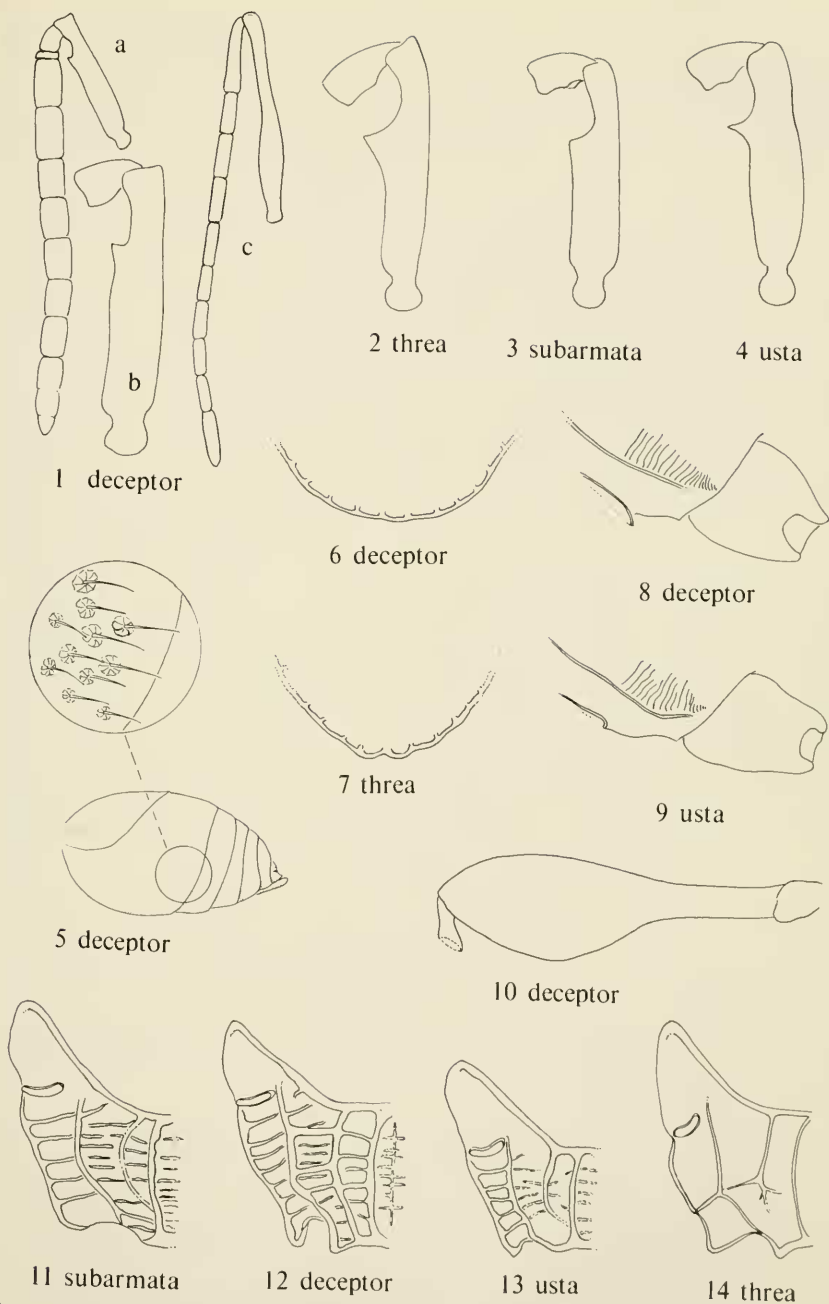
Invreia may be distinguished from other Chalcididae by the following characters: Hindtibia essentially truncate distally, two hindtibial spurs present (Haltichellinae); marginal vein slightly removed from anterior margin of wing, but parallel to it, postmarginal vein absent, stigmal vein rudimentary (Hybothoracini); scutellum posteriorly rounded, subtruncate, or slightly bilobed but without large projecting dents, propodeum not extended backwards on sides of abdomen, clypeus not developed as a projection, first tergum without lateral carinae at base.

In the descriptions all ratios were measured at 50× except ocellar ratios which were measured at 100×. All characters were measured in the flattest plane. Thoracic length was measured from the anterior extent of the pronotum to the posterior extent of the propodeum. Sculpture was described using fluorescent and incandescent light and largely follows the nomenclature of Eady (1968). Propodeal terms are adapted from Bouček (1951). Holotypes are in the U.S. National Museum of Natural History, Washington, D.C. (USNM).

Invreia deceptor Grissell and Schauff, NEW SPECIES

Figs. 1, 5, 6, 8, 10, 12, 15, 17,

Holotype female.—Length 3.8 mm. Ratio head:thorax:abdomen 25:90:80. Black except the following reddish brown: Basal ½ of scape, fore- and midlegs except coxae, hindtibia, tarsi, and base and apex of hindfemur. Face (Fig. 15) barely wider than high (53:50), eye essentially bare, eye height:interocular distance at vertex 25:27, lateral ocellus:ocellocular length:postocellar length 10:7:25, malar:intermalar distances 20:21; upper face with punctures ca. own diameter apart each with recurved seta, lower face laterad of scrobes rugulose and covered with appressed dense silvery pubescence; scrobe nearly reaching median ocellus, finely aciculate; flagellum (Fig. 1c) filiform, scape swollen in basal ½, ratio beginning with scape 38:15:7:8:8:8:7:7:7:11 (club counted as 1), pedicel 5.0× longer than wide (15:3). Thorax ratio pronotum:scutum:scutellum:propodeum 28:27:30:20; pronotum medially and anterior of scutum (Fig. 17) with setigerous punctures separated by ca. own diameter, seta length ca. 2× puncture diameter,



Figs. 1-14. *Invreia* spp. 1, Antenna, lateral (a, b = male; c = female). 2-4, Scape, male, inner. 5, Abdomen, lateral, insert shows sculpturing. 6-7, Scutellum, posterior apex, dorsal. 8-9, Thorax, mesepisternum and hindcoxa, lateral. 10, Midfemur, lateral. 11-14, Propodeum, dorsal.

interspaces lightly transversely aciculate, slide lobe along notaular border with several punctures on otherwise aciculate background, setigerous punctures elsewhere on thorax (including pronotum laterally) variably spaced without apparent or regular ridges between, aciculation fading on posterior of scutum, nearly polished here and on scutellum; pronotum dorsolaterally with punctures nearly contiguous, laterally punctures mixed with reticulation continuing to ventral marginal strip which is reticulate; mesepisternum with forecoxal depression prolonged into toothlike flange ventrally (Fig. 8), posterior apex of scutellum rounded (Fig. 6); propodeum (Fig. 12) with complete, equally developed, submedian, accessory, sublateral, and lateral carinae, median carina present but much weaker than others, posterolateral margin angulate, produced about as far backward as petiolar foramen; midfemur (Fig. 10) distally swollen, rounded ventrally, nearly $3\times$ wider distally than proximally (11:4); forewing length:width 110:40, hyaline, submarginal:marginal:stigmatal veins 43:8:3. Abdomen elliptical in side view, tergum I reaching ca. $\frac{1}{2}$ length of abdomen (40:80), epipygidium and ovipositor barely visible from above; tergum I laterally polished, dorsally appearing mostly polished, faintly reticulate in median $\frac{1}{4}$ becoming polished laterally; tergum II laterally polished towards base parallel to lower margin of tergum I, otherwise covered with sparse regularly placed setae each surrounded at base by "petallike" arrangement of reticulation (Fig. 5; best seen at $25\times$ or higher), dorsally polished; complete terga II-VI with anterior polished, posterior reticulate with setal row, tergum VI inclined.

Allotype male.—Length 3.8 mm. Black except the following reddish brown: foretibia, distal $\frac{1}{2}$ of midfemur, tips of mid- and hindtibiae, all tarsi. Setae and structure as for female except: Scape (Fig. 1a, b) subapically incised with upward projecting denticle on lower margin, antennal ratio beginning with scape 24:5:2:9:9:8:8:8:7:7:14 (club counted as 1). Punctures on scutellum nearly contiguous. Reticulation on dorsum of tergum I as heavy as terga II-VI, terga II with areas between setae evenly reticulate (rather than with distant "petallike" reticulations at base as in female).

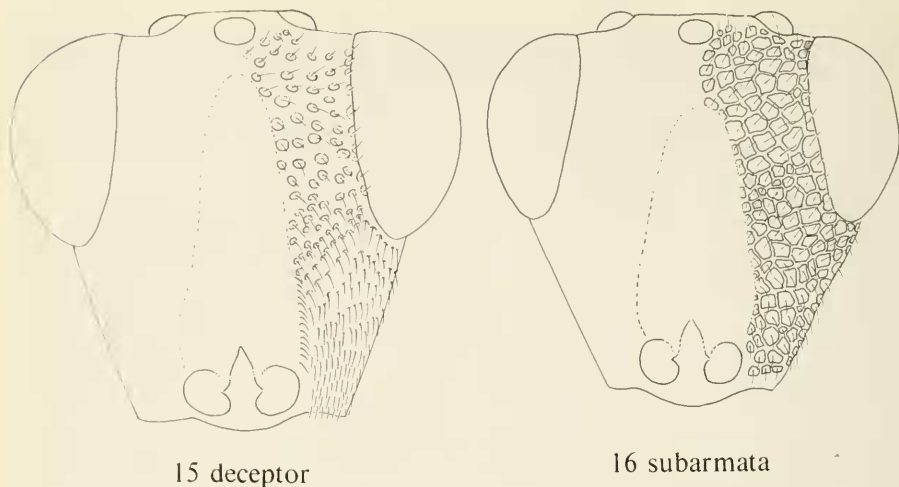
Holotype.—♀, Texas, Comanche County, 3 miles west DeLeon, 10-VII-1978, R. L. Sams; reared from *Elasmopalpus lignosellus* pupa in peanuts, USNM type no. 76269.

Allotype and paratypes.—Allotype ♂ and 9 ♀, 2 ♂ paratypes, same data as holotype (except collection dates range from 13-VII to 10-X-1978). 9 ♀, 14 ♂ paratypes, laboratory culture, parental stock from same locality, S. Johnson. Other paratypes as follows: 2 ♀, 2 ♂, Beattie, Texas, 18-VIII-1975, 6-25-IX-1976, S. Johnson, host data same as holotype. Specimens not paratypes, all from Oklahoma as follows: Reared from *E. lignosellus* pupae: 1 ♀, Acme, Grady Co., 22-VII-1974; 1 ♂, Colbert, Bryan Co., 1-VIII-1972; 1 ♀, Enos, Marshall Co., 13-VIII-1973; 1 ♀, Holdenville, Hughes Co., 19-VII-1974; 6 ♀, Madill, Marshall Co., various dates from 17-VIII to 3-X;

reared from *Stegasta bosqueella*: 60 ♀, 88 ♂, Marshall Co., R. Wall, 15-VIII to 29-IX-1975-76; 1 ♀, Madill, 10-VIII-1972. Paratypes will be deposited in the British Museum (Natural History) (London), the Canadian National Collection (Ottawa), the Florida State Collection of Arthropods (Gainesville), the Department of Entomology, Texas A. & M. University (College Station), and the USNM.

Variation.—Females (31) from *Elasmopalpus* vary in length from 2.9 to 3.8 mm; males (19) from 2.3 to 3.8 mm. Females (61) from *Stegasta* vary from 2.0 to 2.3 mm and males (88) from 2.3 to 2.7 mm. About one-fourth of the females from *Elasmopalpus* have the scape all dark; the rest are like the holotype. Almost all the females from *Stegasta* have the scape dark. Males are generally like the allotype, but a few small ones (ca. 2.5 mm) are entirely black except the tarsi. The denticle of the scape may not be as pronounced as in Fig. 1b. The median propodeal carina is present at least as a vague, broken line in all specimens, but the accessory carinae become irregular posteriorly in some specimens and fade before reaching the hindmargin of the propodeum.

Discussion.—In Nikol'skaya's key to world *Invreia* (1960), *deceptor* would be placed in rubric 26, keying out with *subarmata* (Förster). In direct comparisons with specimens, the females of both species agree in the elongate antenna with pedicel about 5× as long as wide and scape a little less than 3× the length of the pedicel. Both have the malar distance slightly shorter than the eye height, the marginal vein about 2.5× the length of the stigmal vein, the apparent sixth abdominal segment inclined (not vertical), the interspaces between scutal punctures aciculate, and the midfemora rounded ventrally with the greatest width in the distal third (Fig. 10) as opposed to angulate and/or with greatest width at the midpoint. Female *deceptor* may be distinguished from *subarmata* as follows: *Invreia deceptor* with lower face covered with dense, silvery pubescence on either side of scrobal basin and area beneath setae rugulose (Fig. 15) (*subarmata* with few setae on either side of scrobal basin, each placed in distinct puncture, Fig. 16); *deceptor* has anterior portion of scutum with punctures generally separated by puncture diameter or more (Fig. 17) (*subarmata* with punctures less than own diameter or nearly contiguous, Fig. 18); propodeum of *deceptor* with posterolateral margins developed as sharp angles (Fig. 12) (*subarmata* with margins nearly right angled, Fig. 11); and *deceptor* with fore- and midlegs (except coxae) concolorous reddish brown (*subarmata* has legs nearly black). Males of *deceptor* may be separated from those of *subarmata* by the characters just mentioned (except legs of *deceptor* are mostly black) as well as the following: In *deceptor* the antennal scape has an incision subapically with upward projecting denticle and the pedicel unmodified beneath (Fig. 1b), whereas in *subarmata* the incision is merely angulate basally and the pedicel has a protuberance (Fig. 3); *deceptor* has



15 deceptor

16 subarmata

Figs. 15-16. *Invreia* spp., face, female.

the wing hyaline beneath the marginal vein while *subarmata* has the wing weakly stained brown for about one-third the wing length from stigma to base.

Among Nearctic species, females of *deceptor* are morphologically like *threa* in having the mesepisternal depression with a projection, but otherwise share more characters with *usta* (e.g. smooth, punctate pronotum, smooth lateral area of tergum I). *Invreia deceptor* may be separated from both by characters given in the key. Males differ as discussed under *usta*.

Etymology.—From the Latin *deceptor* meaning "deceiver" in reference to its confusion with *mirabilis*.

Invreia usta Grissell and Schauff, NEW SPECIES

Figs. 4, 9, 13, 19

Holotype female.—Length 3.8 mm. Ratio head:thorax:abdomen 26:80:82. Black except the following orange brown: scape, pedicel, midcoxa, apex of hindcoxa, all legs beyond coxae (except hindfemur infusate medially on outer side, ventrally with denticles nearly black, hindtibia ventrally with dark carinae), and tegula. Face slightly wider than high (54:48), eye essentially bare, eye height:interocular distance (at vertex) 25:29, lateral ocellus:ocellocular length:postocellar length 7:4:25, malar:intermalar distances 19:25; upper face with punctures ca. own diameter apart, each with recurved seta (as in Fig. 15); lower face laterad of scrobes rugose and covered with appressed dense silvery pubescence: scrobe nearly reaching median ocellus, finely aciculate: flagellum filiform, scape swollen in basal $\frac{1}{2}$, ratio (beginning with scape) 36:12:6:7:7:7:7:6:6:6:11 (club counted as 1), pedicel 4.0 \times longer

than wide (12:3). Thorax ratio, pronotum:scutum:scutellum:propodeum 25:23:31:18; pronotum medially and scutum anteriorly with setigerous punctures separated by ca. own diameter, seta length ca. $2\times$ puncture diameter, interspaces lightly longitudinally aciculate; pronotum laterally with punctures contiguous, laterally punctures mixed with reticulation continuing to ventral marginal strip which is reticulate; side lobes (Fig. 19) along notaular border with few punctures, scutum medially and anterior of scutellum with punctures separated by ca. $2\times$ own diameter, interspaces aciculate anteriorly becoming highly polished posteriorly, scutellum laterally with punctures contiguous, posterior apex of scutellum rounded (Fig. 6); mesepisternum with forecoxal depression not prolonged into a flange (Fig. 9); propodeum (Fig. 13) with complete, equally developed, submedian, sublateral, and lateral posterolateral carinae, accessory carinae fading posteriorly, no median carina, posterolateral margin angulate, produced ca. as far backward as petiolar foramen; hindfemur distally swollen, rounded ventrally, $2.5\times$ wider distally than proximally (10:4). Forewing length:width 124:50, hyaline, submarginal:marginal:stigmatal veins 48:8:3. Abdomen elliptical in side view, tergum I reaching less than $\frac{1}{2}$ length of abdomen (37:92); epipygidium and ovipositor barely visible from above; tergum I laterally polished with few setae at dorsolateral margins, dorsally almost uniformly "reticulate" (at $25\times$; actually microscopically punctulate at higher magnification) except posterior $\frac{1}{6}$ fading to faint reticulate-coriaceous sculpture; tergum II laterally with narrow anterior margin polished, otherwise reticulate and covered with regularly placed setae, some with "petallike" reticulation (as in Fig. 5), dorsally reticulate about like posterior of tergum I, medially without setae; entire terga III-VI polished anteriorly, reticulate with setal row posteriorly; tergum VI inclined.

Allotype male.—Length 2.9 mm. Black, reddish brown as follows: Flagellar segments beneath, fore- and midlegs past coxae (ventral forefemur and apical $\frac{1}{2}$ of midfemur infuscate), distal tip of hindcoxa, apical and distal tip of hindfemur, hindtibia, tarsi (hindtibia ventrally with dark carinae), tegula (dorsal edge black). Structurally as for female except: Malar:intermalar distances 15:25, scape (Fig. 4) subapically incised with forward projecting denticle on lower margin, pedicel with ventral protuberance, antennal ratio beginning with scape 20:5:2:9:7:7:6:6:6:6:13 (club counted as 1). Thorax ratio, pronotum:scutum:scutellum:propodeum 28:25:25:15, pronotum dorsolaterally with contiguous punctures, laterally shining to ventral marginal strip which is reticulate, thorax irregularly covered with setae $4-6\times$ length of own puncture diameter; anterior of scutellum with punctures irregularly separated by from ca. $1-4\times$ own diameter, posterolateral margin of propodeum an obtuse angle, not produced caudally as far as the petiolar foramen; abdomen without "petallike" reticulation.

Holotype.—♀, Texas, Comanche County, 3 miles west DeLeon, 14-VIII-

1978, R. L. Sams; reared from *Elasmopalpus lignosellus*, in peanuts (No. 81), USNM type no. 76488.

Allotype and paratypes.—Allotype ♂, 3 paratype ♀, same data as holotype except dates 17-VIII (allotype, no. 158), 20-VII (no. 28), 24-VIII (no. 39), 1-IX (no. 36). Paratypes in USNM, British Museum (Natural History), and Department of Entomology, Texas A. & M. University.

Variation.—In two female specimens the accessory carinae of the propodeum fade out posteriorly, but in the other two females and the male a transverse carina connects the accessory to the sublateral carinae. One female has the hindoxa and femur (except denticles) entirely orange brown.

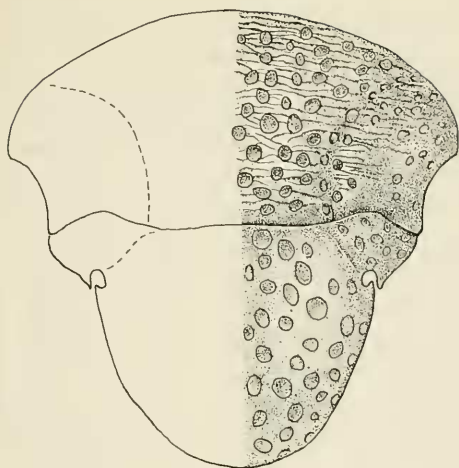
Discussion.—*Invreia usta* runs to rubrics 25 and 28 of Nikol'skaya's key (1960) but fits neither alternative. It has a polished thorax as in 28, but the marginal vein is only about $2.5\times$ the stigmal as in 25. Among females of the three New World species, *usta* has the reddish coloration of *threa* (legs, tegulae) but is distinguished from both *deceptor* and *threa* by the dorso-median area of the scutum and anterior of scutellum with punctures about two diameters apart and polished between as opposed to one diameter or less apart and reticulate to aciculate between (cf. Figs. 17, 19, 20). Males of *usta* may also be distinguished from *deceptor* and *threa* by the setae on the dorsum of the thorax being about four to six times the length of its puncture diameter, but setae only about two times or less as long in *deceptor* and *threa*. From *deceptor*, male *usta* may be distinguished by the strongly outward projecting denticle on the inner side of the scape (Fig. 4), whereas in *deceptor* the denticle projects upwards and is less developed (Fig. 1b); and in *usta* the lateral corners of the propodeum form an obtuse angle, whereas in *deceptor* they form an acute angle which projects caudally.

Etymology.—From the Latin *usta* meaning "burnt color" in reference to the legs of this species.

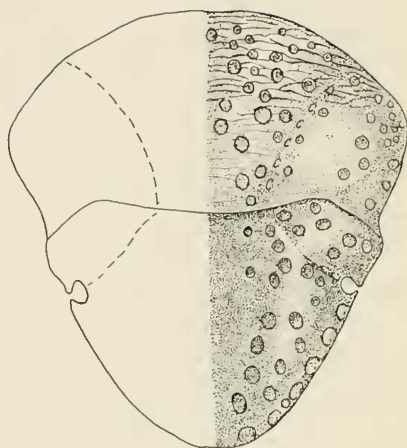
Invreia threa Grissell and Schauff, NEW SPECIES

Figs. 2, 7, 14, 20

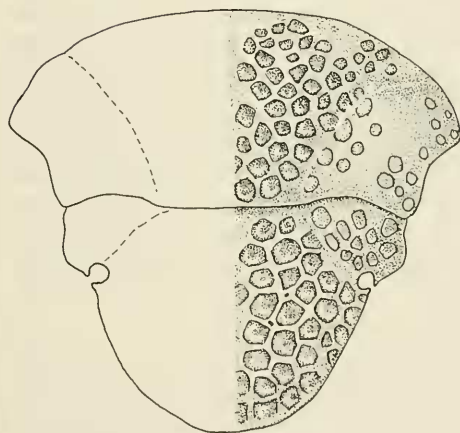
Holotype female.—Length 2.5 mm. Ratio head:thorax:abdomen 20:55:60. Black except the following reddish brown: Scape, midcoxa, all legs past coxae (except hindfemur ventrally with denticles nearly black, hindtibia ventrally with dark carinae), and tegula. Face barely wider than high (45:40), eyes essentially bare, eye height:interocular distance (at vertex) 20:20, lateral ocellus:ocellocular length:postocellar length 7:5:20, malar:intermalar distances 18:16, face medially (scrobal basin) reticulate merging to strigose or rugose laterally, scrobe nearly reaching midocellus as faint, setaeless depression; upper face with evenly placed recurved to recumbent setae, area laterad of scrobe with recumbent to appressed dense silvery pubescence; flagellum filiform, scape swollen in basal $\frac{1}{2}$, ratio beginning with scape 30:19:5:6:7:7:5:5:5:5:10 (club counted as 1), pedicel $3.0\times$ longer than



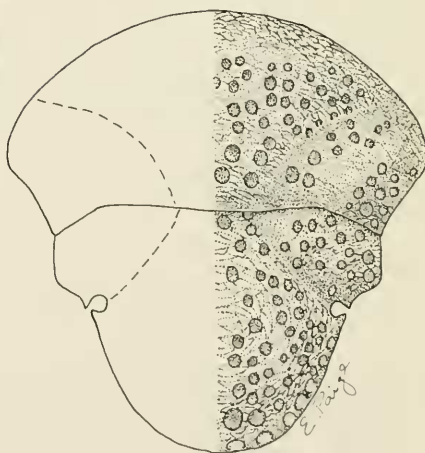
17 deceptor



19 usta



18 subarmata



20 threa

Figs. 17-20. *Inureia* spp., thorax excluding pronotum, dorsal.

wide (9:3). Thorax ratio, pronotum:scutum:scutellum:propodeum 22:24:27:13; pronotum, scutum, and scutellum generally with setigerous punctures separated by ca. own diameter (Fig. 20), seta length scarcely $1\times$ puncture diameter, interspaces reticulate-aciculate, side lobes of scutum,

axillae, and anterior of scutellum with punctures ca. 2 or more diameters apart; pronotum dorsolaterally with punctures nearly contiguous, lateral lower $\frac{2}{3}$ evenly reticulate, without punctures; posteromedial margin of scutellum subtruncate; mesepisternum with forecoxal depression prolonged into toothlike flange ventrally (as in Fig. 8); propodeum distinctly reticulate between major carinae, with submedian, sublateral, and lateral carinae complete, accessory carina fading posteriorly, no median carina, areas between carinae without transverse carinae or where present carinae weak, posterolateral margin angulate, produced backward as far as petiolar foramen (Fig. 14); midfemur distally swollen, rounded ventrally, ca. $2.5\times$ wider distally than proximally (10:4); forewing length:width 90:35, hyaline, submarginal:marginal:stigmatal veins 35:5:2. Abdomen ovate-elliptic in side view, tergum I reaching ca. $\frac{1}{2}$ length of abdomen (33:65), epipygidium and ovipositor barely visible from above; terga uniformly reticulate; tergum I with few setae dorsolaterally, others with single setal row posteriorly, except tergum II bare medially, and tergum VI with several rows; tergum VI inclined.

Allotype male.—Length 1.7 mm. Black, reddish brown as follows: Flagellar segments beneath, forefemur distally, foretibia distally and beneath, foretarsi (distal segment darker), midfemur and midtibia distally, midtarsi (distal 2 segments darker), apical and distal tip of hindfemur, distal $\frac{1}{3}$ of hindtibia, hindtarsi (distal 2 segments darker), tegula posteriorly. Setae and structure as for female except: Face wider than high (40:30), lateral ocellus:ocellocular length:postocellar length 10:3:23, malar:intermalar distances 13:16, scape (Fig. 2) subapically incised with forward projecting denticle on lower margin, antennal ratio beginning with scape 16:5:1:6:5:5:5:5:5:11 (club counted as 1). Thorax ratio pronotum:scutum:scutellum:propodeum 13:16:18:8, anterior of scutum with punctures separated by ca. $1-3\times$ own diameter, side lobes of scutum with few punctures medially; posteromedial margin of scutellum not emarginate; forecoxal flange present, but difficult to see. Forewing length:width 75:30, submarginal:marginal:stigmatal veins 30:5:2. Abdomen with 1st tergum reaching past $\frac{1}{2}$ length (80:50) (posterior segments telescoped forward), tergum I with dorsal reticulation fading at lateral and posterior margins, tergum II with several rows of setae laterally.

Holotype.—♀, Oklahoma, Marshall County, 9-IX-1975, R. Berberet; No. 84, reared from *Stegasta bosqueella*, USNM type no. 76489.

Allotype and paratypes.—Allotype ♂, same data as holotype, except No. 111, 13-IX-1975; 55 ♀, 27 ♂ paratypes, same data, except 31-VII to 30-IX-1975-76; 1 ♂ paratype same data, except collected in Enos, 21-VIII-1974; 2 ♀ paratypes, Texas, Comanche County, 3 miles west DeLeon, 13-VII (No. 45) and 14-VIII (No. 187), reared from *Elasmopalpus lignosellus* pupa in peanuts. Paratypes in USNM, British Museum (Natural History), and the departments of entomology of Texas A. & M. University and Oklahoma State University.

Variation.—Differences among female specimens available for study are confined to the scutellum, the propodeum, and color. In one specimen there is a sharp angle formed at the intersection of the lateral carina and cross carina from the sublateral. A single specimen has a weak median propodeal carina which fades out dorsally. In all specimens the transverse carinae are variable in presence and/or intensity, not being as well developed as the primary longitudinal carinae. The areas between carinae are almost uniformly reticulate. In several specimens (from both *Elasmopalpus* and *Stegasta*) the apex of the scutellum is slightly bilobed (Fig. 7), in most it is as in Fig. 6, and in several it is nearly squared-off apically. The color of the hindfemur in females varies from all orange to black medially with orange apices. In some specimens from *Stegasta* the tegula is black for both sexes. Females from *Elasmopalpus* have the tegula orange. Females from *Stegasta* vary in length from 1.6 mm to 2.5 mm, males from 1.6 mm to 2.1 mm. Females from *Elasmopalpus* vary from 2.5 mm to 2.9 mm.

Discussion.—*Invreia threa* would be placed in rubric 27 of Nikol'skaya's key (1960). It agrees with *subtilis* Nikol'skaya in the generally small size (2.5 mm) and reddish coloration of antenna, tegula, and legs. According to the description, however, *subtilis* has the abdomen polished dorsally whereas *threa* is evenly reticulate dorsally. Additionally, *subtilis* has the posterolateral corners of the propodeum rounded and without dentation, whereas *threa* has the corners angulate and produced caudally.

From Nearctic *Invreia*, *threa* may be distinguished by characters given in the key and by the reticulate ventral half of the lateral aspect of the pronotum. In *deceptor* and *usta* this area has setigerous punctures extending nearly to the ventral edge.

Etymology.—A euphonious, arbitrary combination of letters.

KEY TO NEARCTIC SPECIES OF *INVREIA*

1. Males, scape on apicoventral margin produced as a denticle; pedicel scarcely longer than broad (Fig. 1a) 2
- Females, scape without denticle; pedicel 3–5× longer than broad (Fig. 1c) 4
2. Denticle of scape projecting upward (Fig. 1b)
..... *deceptor*, new species
- Denticle of scape projecting outward (Figs. 2, 4) 3
3. Pronotum laterally $\frac{2}{3}$ reticulate, no punctures; setae on dorsum of thorax subequal in length to own puncture diameter
..... *threa*, new species
- Pronotum laterally with mixture of reticulation and punctures; seta on dorsum of thorax 4–6× own puncture diameter .. *usta*, new species
4. Tergum I dorsally evenly reticulate (except narrow posterior polished band), lateral part of tergum either polished or reticulate; hind-

- femur entirely brownish or orange, or infused with black; tegula orange to black 5
- Tergum polished dorsally (faint reticulation may be visible medially) continuing to lateral part of tergum; tegula and hindfemur black *deceptor*, new species
5. Tergum I as reticulate laterally as dorsally; scutellum reticulate-aciculate between punctures (Fig. 20) *threa*, new species
- Tergum I polished laterally; scutellum smooth between punctures (Fig. 19) *usta*, new species

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LITERATURE CITED

- Bouček, Z. 1951. The first revision of the European species of the family Chalcididae. Acta Entomol. Mus. Natl. Pragae 27(Suppl. 1): 1–108, 17 pls.
- Eady, R. D. 1968. Some illustrations of microsculpture in the Hymenoptera. Proc. R. Entomol. Soc. Lond. (A) 43: 66–72.
- Erdős, J. 1957. Miscellanea chalcidologica Hungarica. Ann. Hist.-Nat. Mus. Natl. Hung. (n.s.) 8: 347–374.
- Habu, A. 1970. Description of a new *Invreia* species parasitic on a paddy stem borer in Pakistan. Mushi 43: 45–49.
- Nikol'skaya, M. N. 1960. Fauna USSR: Hymenoptera VII (No. 5). Chalcidoids, families Chalcididae and Leucospidae. Zool. Inst. Akad. Nauk SSR, Moscow (n.s.) No. 76, 221 pp.
- Steffan, J. R. 1962. Chalcidoïdes de L'Institut National D'Entomologie de Rome. Fragm. Entomol. 4: 19–39.
- . 1976. Les *Euchalcidia* Masi du bassin méditerranéen. Bull. Soc. Entomol. Fr. 81: 52–63.
- Wall, R. and R. C. Berberet. 1975. Parasitoids associated with lepidopterous pests on peanuts: Oklahoma fauna. Environ. Entomol. 4: 877–882.